Great Basin Unified
Air Pollution Control District

2010 Ambient Air Monitoring Network Plan For National Core (NCORE) Monitoring Station

located at
White Mountain Research Station
Bishop, California

April 16, 2010

Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514

National Core (NCore) Multi-pollutant Monitoring Stations:

In October 2006 the United States Environmental Protection Agency (EPA) issued final amendments to the ambient air monitoring regulations for criteria pollutants. These amendments are codified in 40 CFR parts 53 and 58. The purpose of the amendments was to enhance ambient air quality monitoring to better serve current and future air quality needs. One of the most significant changes in the regulations was the requirement to establish National Core (NCore) multi-pollutant monitoring stations. These stations will provide data on several pollutants at lower detection limits and replace the National Air Monitoring Station (NAMS) networks that have existed for several years. The final network plan must be submitted to EPA by July 1, 2010 and the stations must be operational by January 1, 2011.

The NCore Network addresses the following monitoring objectives:

- timely reporting of data to the public through AIRNow, air quality forecasting, and other public reporting mechanisms
- support development of emission strategies through air quality model evaluation and other observational methods
- accountability of emission strategy progress through tracking long-term trends of criteria and non-criteria pollutants and their precursors
- support long-term health assessments that contribute to ongoing reviews of the National Ambient Air Quality Standards (NAAQS)
- compliance through establishing nonattainment/attainment areas by comparison with the NAAQS
- support multiple disciplines of scientific research, including; public health, atmospheric and ecological

In 2007 and 2010, EPA provided funding to the Great Basin Unified Air Pollution Control District (the District) to begin the process of establishing an NCore station in the Eastern Sierra region of California. After evaluating the existing network, historical data, meteorology, and topography the District recommends the following changes to its air monitoring network to become effective July 1, 2009, and implemented by January 1, 2010:

1) Establish an NCore multi-pollutant monitoring station in the Eastern Sierra region at the White Mountain Research Station (WMRS), 3000 East Line Street, Bishop, California. The location meets the objective for a rural NCore site and meets regional scale criteria for $PM_{2.5}$, PM_{10}, ozone (O_3), total reactive nitrogen (NO_y), and carbon monoxide (CO).

2) For the near-term, collocate the NCore station with the District's existing Portable monitoring station, which collects data for PM10 (continuous), wind speed, wind direction, ambient temperature, and relative humidity.

Monitoring Objective
Determine compliance with NAAQS; observe pollution trends for national data analysis, provide pollution levels for daily index reporting; and provide data for scientific studies.

Table 1 Monitors

Monitor Type	Designation	Analysis Method	Frequency of Sampling
Carbon Monoxide (CO)	NCore	Automated Reference Method utilizing trace level non-dispersive infrared analysis.	Continuously
Sulfur Dioxide (SO_2)	NCore	Automated Equivalent Method utilizing trace level UV fluorescence analysis	Continuously
PM_{10} TEOM	SLAMS	Automated Equivalent Method utilizing Tapered Element Oscillating Microbalance/gravimetric analysis	Continuously
Total Reactive Nitrogen (NO_y)	NCore	Automated trace level chemiluminescence analysis.	Continuously
Meteorological	SLAMS	Air quality measurements approved instrumentation for wind speed, wind direction, humidity, temperature	Continuously

Quality Assurance Status
All Quality Assurance procedures shall be implemented in accordance with 40 CFR 58, Appendix A. The District's current Quality Assurance Project Plan covers PM_{10}, $PM_{2.5}$, and meteorological measurements. For the trace level instruments, a quality assurance project plan will be developed and submitted prior to use of the trace level instruments and standard operating procedures (SOPs) will be developed for each new instrument used in the project.

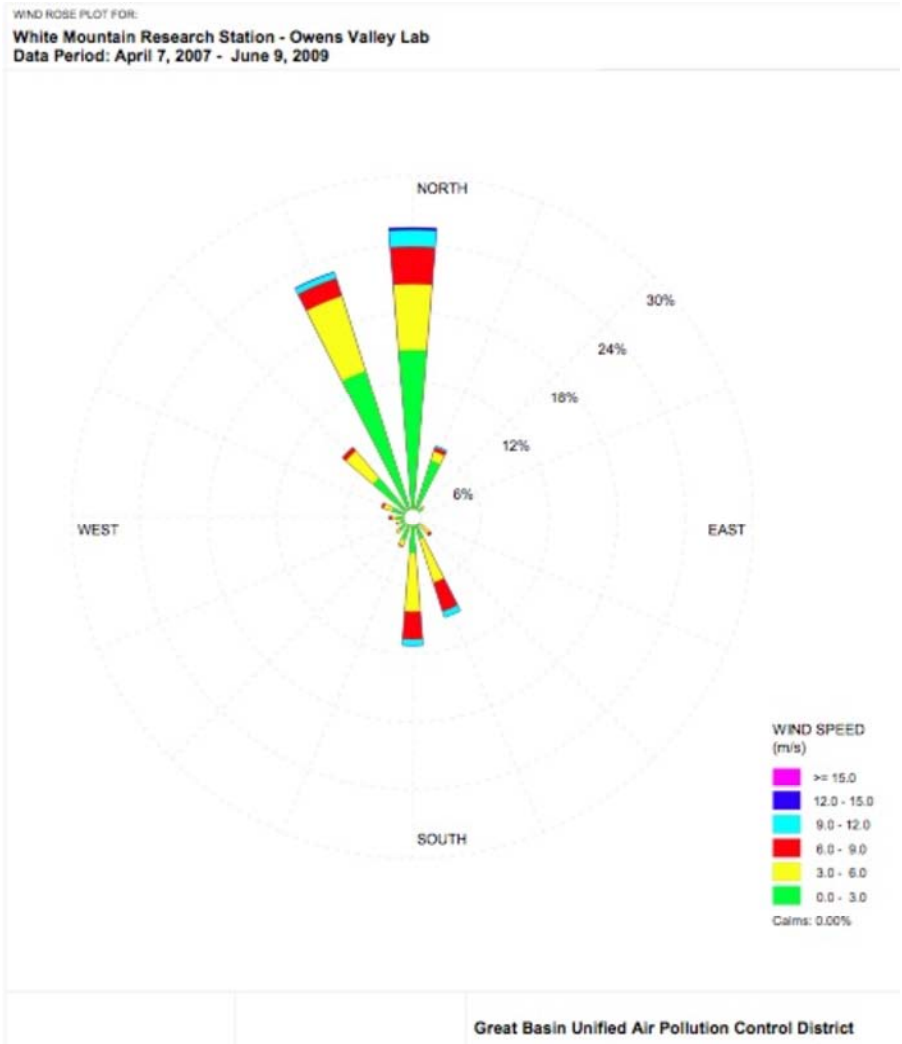
Area of Representativeness
40 CFR Part 58 Appendix D provides design criteria for ambient air monitoring. The monitoring objective for the NCore site is to produce data that represents a large area and therefore the spatial scale of the site is important. The spatial scale defines the physical dimensions of the air parcel nearest to a monitoring site throughout which actual pollutant concentrations are reasonably similar. It is determined by the characteristics of the area surrounding the air monitoring site and the site's distance from nearby air pollution sources such as roadways, factories, etc. In the case of rural NCore stations, which are to be located to determine general background concentrations levels, the spatial scales to be used are regional or larger. Table 2 shows the area of representativeness for each pollutant for the WMRS site.

Table 2: Spatial Scales for Each Pollutant

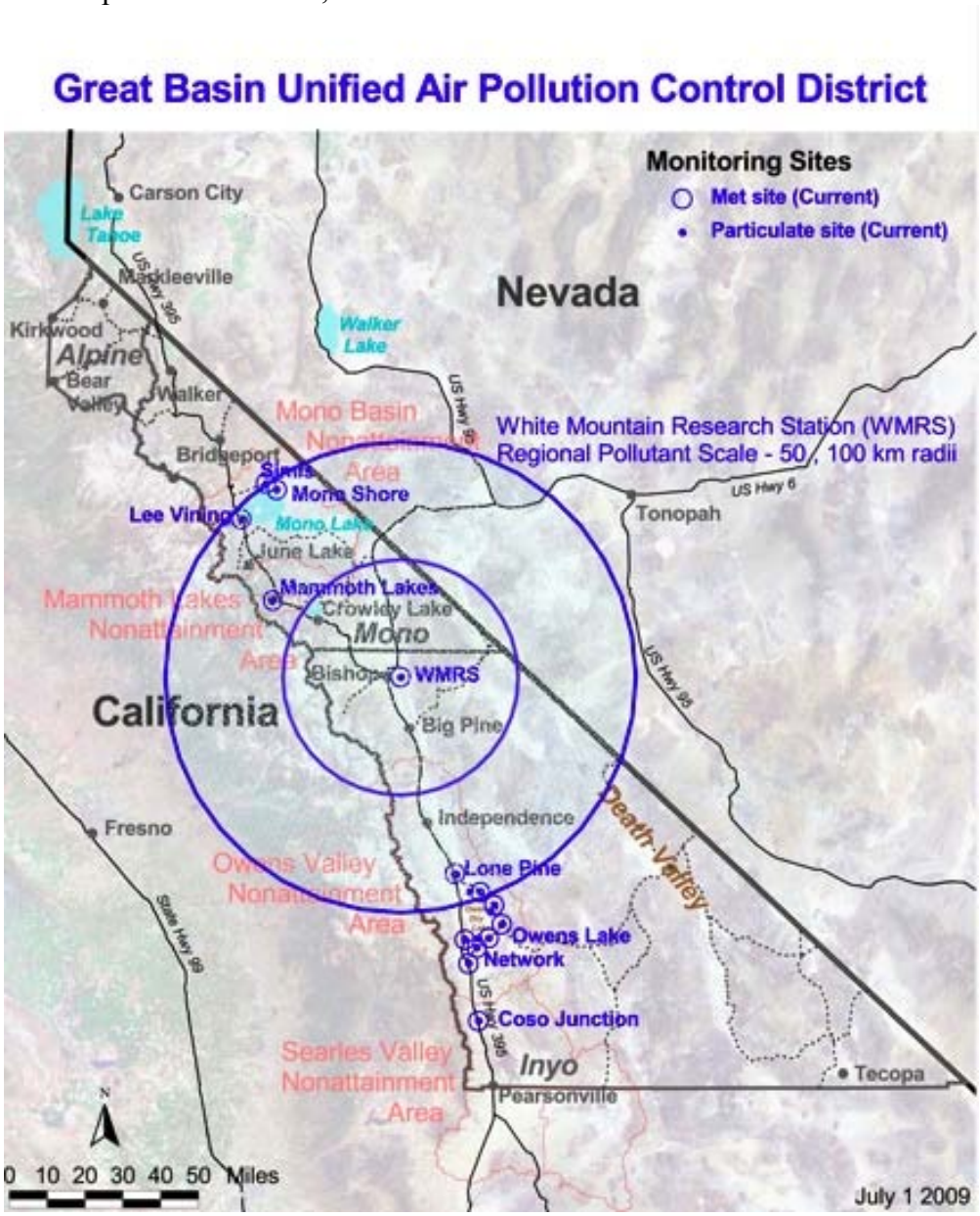
Pollutant	Spatial Scale	Comments
NO_y	Regional Scale	Same scale as used for O_3
CO	> Middle Scale	No Regional scale for CO
SO_2	> Neighborhood Scale	No Regional scale for SO_2
PM_{10}	> Neighborhood Scale	No Regional scale for PM_{10}

For regional scale the area covered is tens of kilometers to hundreds of kilometers.

There are no MSAs within the District's current monitoring network due to the sparse population in this high desert setting, approximately 2 people per square mile. On a 10 km scale the land use varies from riparian areas along the Owens River 1.5 kilometers west of the site to light industry, small commercial, and residential in the City of Bishop (population 4,000) 6 kilometers west of the site. The topography of the area varies from high desert to mountain peaks.

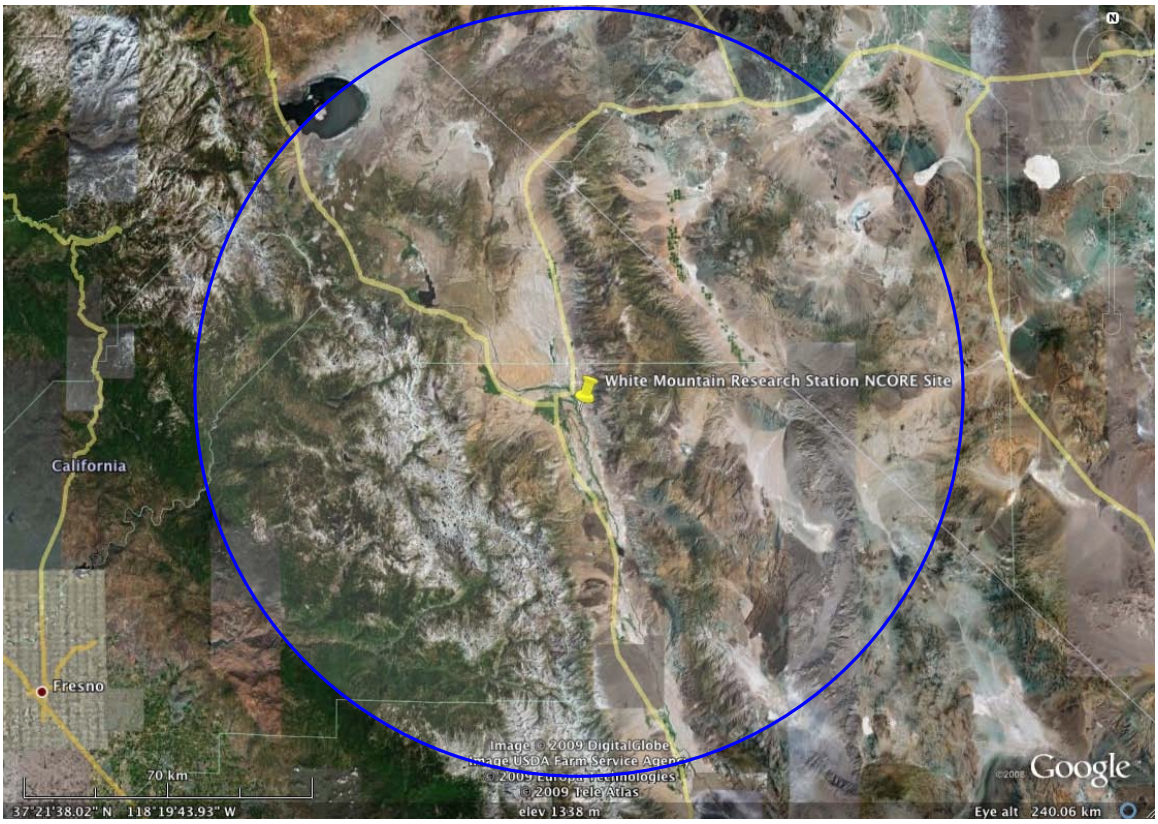


The White Mountain Research Station, where the NCore monitoring station is to be located, is in the Owens Valley, a high-desert valley, the floor of which is at an average elevation of 4,000 feet above mean sea level. The valley is open north to south and is bordered on the east by the White Mountains that rise from the valley floor to an elevation of 10,000 feet, with peaks up to 14,000 feet. The valley is bordered on the west by the Sierra Nevada range, which rises in elevation up to 14,000 feet. As can be seen from the District map and the area-wide view below, the proposed NCore site is located East of the City of Bishop and of the developed area around the City. The wind rose above indicates the prevailing wind directions of north and south, up and down the Owens Valley. The placement of the NCore site east of Bishop provides an excellent location for measuring background pollutant concentrations as there are no major pollution sources, other than particulate matter, for 100km.



White Mountain Research Station
Regional Pollutant Scale 50 and 100 km radii

The Owens Valley, Mono Basin, and Mammoth Lakes Nonattainment areas have been designated as such due to PM10 concentrations that exceed the Federal standard of 150µg/m3. The sources of these concentrations are wind-blown dust from the exposed lakebeds of the Owens and Mono lakes and wintertime wood smoke and road cinders, in the case of Mammoth Lakes. The PM10 influence around Mono Lake is largely restricted to the immediate basin by the topography. The influence around Owens Lake is mostly caused by north winds driving the dust south. Occasional south wind storms will drive the dust northward, but the impacts generally reach only to the community of Independence, 20 miles north of Owens Lake and 40 miles south of the station at the White Mountain Research Station.

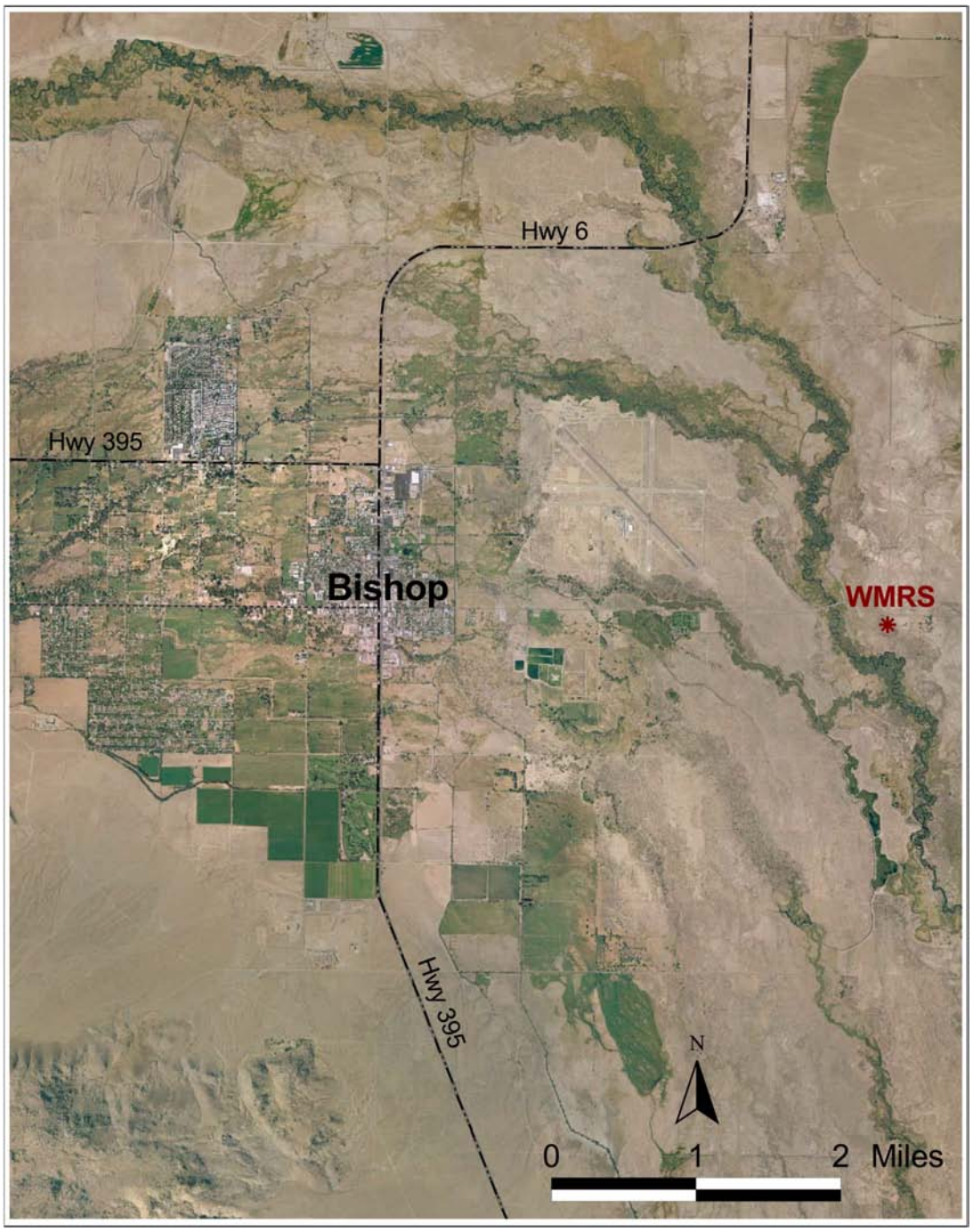


White Mountain Research Station
Topographic Regional Map (90 km radius shown)

Site Description and Spacing:

Site Name: White Mountain Research Station
AQS ID: 06-027-0002
Location: 3000 East Line Street
County: Inyo
GPS Coordinates: 37°21'38" North Latitude, 118°19'50" West Longitude
Date Established: April 7, 2006
Inspection Date: August 20, 2009
Inspection By: Catherine Brown, EPA IX
Site Approval Status: Approved

White Mountain Research Station Compound



The station is located on the grounds of the University of California White Mountain Research Station. The location is in the northeast portion of Inyo County and is approximately 0.5 km east of the Owens River and 4 km east of Bishop, California.

NCore and $PM_{2.5}$ SLAMS Siting Criteria

Appendix E to 40 CFR Part 58-*Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring* contains specific location criteria applicable to NCore and SLAMS siting. The following measurements and data were obtained for evaluation of compliance with the criteria.

1. Horizontal Placement of Sampling Probes:

The gaseous instruments will be placed in a 10'w x 16' l x 8'h air monitoring shelter to be located in an open area. The nearest building is the WMRS maintenance building approximately 150 meters east of the station. The sample probe inlets will be installed approximately 4 meters above the ground. The Districts Portable monitoring station will be placed next to the air monitoring shelter and will included a 10-meter "nested" meteorological tower.

Any manual particulate samplers to be used for the NCore program will be placed on the roof of the monitoring shelter, on the roof of the District's Portable monitoring station adjacent to the NCore shelter, or on a metal platform behind the NCore shelter. The height of the inlets of the particulate samplers will vary between 3-4 meters. The inlet for the continuous PM10 monitor in the Portable station is approximately 1.5 meters above the roof and approximately 4.25 meters above the ground. Inlets for the continuous particulate samplers in the NCore station will be placed on the roof of the air monitoring shelter with the sample inlets 1.5 to 2 meters above the roof (4 meters above ground). The control units will be located inside the temperature controlled shelter.

2. Spacing from Obstructions:

There are no obstructions to air flow around the site. The WMRS maintenance building is located 150 meters east of the proposed NCore station location and is 4 meters in height. This potential obstruction is 37 times the height of the obstruction away from the station and is not in a quadrant where it would affect the prevailing wind direction.

3. Spacing from Roadways:

Tables E-1, E-2, and Figure E-1 of 40 CFR Part 58 Appendix E list the minimum distances from roadways a monitoring probe needs to be based on the average daily traffic (ADT) counts. Table 3 summarizes the findings and includes the minimum separation distance from roadways for each pollutant. ADT counts were obtained from traffic count data from the California Department of Transportation's (CalTrans) website, at http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2005all

Table 3
Spacing from Roadways Analysis

Roadway	ADT	Distance from site (meters)	Minimum Distance Required (meters)			
			Ozone Table E-1	NO/NO_y Table E-1	CO Table E-2	PM Figure E-1
US Highway 395	14,000 (2005)	4,000	40	30	45	80
East Line Street	<1000 (estimated)	85	40	30	45	80

4. Spacing from Minor Sources:

The closest source to the site is the community of Bishop, California, 4 kilometers east of the site. The greater Bishop area has a population of approximately 6,100. Pollutant sources are limited to small businesses, residential home heating, vehicular traffic (14,000 per day) along US Highway 395. There are three permitted sources approximately 3 kilometers east of the site. These sources are listed below (Table 4) along with their emission rates. The first two are concrete batch plants and the last one is a hot mix asphalt plant. These plants' operating schedules are limited to 5 or 6 days per week and to a certain number of weeks per year, usually in the summer months.

Table 4
Minor Source Emissions

Source	Emissions Type	Hours of Operation Per day	Emissions Rates	
			Pounds Per Hr. For Op	Pounds per hour 24hrs/day
7/11 Materials	particulate	14	5.7	0.26
Hiatt	particulate	12	3	1.13
SNC	Particulate	10	18.2	0.53



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Direction	Description	Distance from Site
North	Power line along Line Street/Laws-Poleta Road	85 meters
North East	White Mountains	10 kilometers
East	WMRS Maintenance Building (maintenance and repair shop)	150 meters
South East	Owens Valley, open land	
South	Owens Valley, open land	
South west	Owens Valley, open land	
West	Bench above Owens River	600 meters
North West	Owens Valley, open land	

Site Details:

This Google Earth[tm] image indicates where the air monitoring shelter will be located on the White Mountain Research Station compound. The shelter will be 8' w x 16'l x 8' h. The roof of the shelter is flat to support the sample inlets for the continuous particulate samplers and has additional room for other samplers if the need arises. The 10-meter meteorological tower and the District's Portable monitoring station will be placed next to the NCore shelter. The meteorological tower is a "nested" type that provides for easy servicing and calibration of the meteorological instruments. The shelter will be wired for 200 amp service and have internet and cellular telephone connections. The shelter will have a heating and air conditioning system that will maintain indoor temperatures between 20-30 º C.